

What is claimed is:

1. A method of treating a subterranean formation comprising:
providing a treatment fluid that comprises a surfactant-free emulsion, the surfactant-free emulsion comprising an oleaginous fluid, a fluid that is at least partially immiscible with the oleaginous fluid, and emulsion facilitating particles; and
treating the subterranean formation.
2. The method of claim 1 wherein the emulsion facilitating particles interact with the oleaginous fluid and the fluid that is at least partially immiscible with the oleaginous fluid to at least partially stabilize the surfactant-free emulsion.
3. The method of claim 1 wherein the method of treating the subterranean formation comprises a stimulation operation.
4. The method of claim 3 wherein the stimulation operation comprises a fracturing operation.
5. The method of claim 3 wherein the stimulation operation comprises an acid stimulation treatment.
6. The method of claim 5 wherein the acid stimulation treatment comprises a matrix acidizing process or a fracture acidizing process.
7. The method of claim 1 wherein the method of treating a subterranean formation comprises completing a well.
8. The method of claim 1 wherein the method of treating a subterranean formation comprises drilling a well bore.
9. The method of claim 1 further comprising flowing back a portion of the treatment fluid from the subterranean formation.
10. The method of claim 9 wherein the treatment fluid further comprises a breaker.
11. The method of claim 1 wherein the surfactant-free emulsion comprises a continuous phase and a discontinuous phase.
12. The method of claim 11 wherein the continuous phase comprises the oleaginous fluid.

13. The method of claim 11 wherein the continuous phase comprises the fluid that is at least partially immiscible with the oleaginous fluid.
14. The method of claim 1 wherein the emulsion facilitating particles have a fluid contact angle in the range from about 70° to about 140°.
15. The method of claim 1 wherein the emulsion facilitating particles have a first fluid contact angle for the continuous phase and a second fluid contact angle for the discontinuous phase.
16. The method of claim 15 wherein the first fluid contact angle for the continuous phase is about equal to the second fluid contact angle for the discontinuous phase.
17. The method of claim 15 wherein the first fluid contact angle for the continuous phase is greater than the second fluid contact angle for the discontinuous phase.
18. The method of claim 1 wherein at least a portion of the emulsion facilitating particles are smaller than about 75 microns.
19. The method of claim 1 wherein the emulsion facilitating particles comprise any organically modified material.
20. The method of claim 19 wherein the organically modified material comprises silicas, fumed silicas, aluminum, titanium, zirconium, or various clay types.
21. The method of claim 1 wherein the emulsion facilitating particles comprise a metal sulfate.
22. The method of claim 1 wherein the emulsion facilitating particles comprise a polymer or combination of polymers.
23. The method of claim 1 wherein the oleaginous fluid comprises diesel oil, crude oil, paraffin oil, an olefin, an ester, an amide, an amine, a synthetic oil, an ether, an acetal, a dialkyl carbonate, a hydrocarbon, or combinations thereof.
24. The method of claim 1 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises fresh water, sea water, salt water, or brine.
25. The method of claim 24 wherein the brine comprises a H₂O soluble salt.

26. The method of claim 1 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises a heavy brine.

27. The method of claim 1 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises glycerin, a polyglycol amine, a glycol, a polyol, a derivative thereof, or a combination thereof.

28. The method of claim 1 wherein the treatment fluid further comprises proppant particulates, gravel particulates, a viscosifier, a thinner, a lubricant, an anti-oxidant, a weighting agent, an H₂O soluble salt, a wetting agent, a fluid loss agent, a corrosion inhibitor, a surfactant, or a scale inhibitor.

29. A method comprising:
drilling a well bore in a subterranean formation using a surfactant-free emulsion drilling fluid that comprises:
an oleaginous fluid;
a fluid that is at least partially immiscible with the oleaginous fluid; and
emulsion facilitating particles.
30. The method of claim 29 wherein the emulsion facilitating particles have a first fluid contact angle for the continuous phase and a second fluid contact angle for the discontinuous phase.
31. The method of claim 30 wherein the first fluid contact angle for the continuous phase is about equal to the second fluid contact angle for the discontinuous phase.
32. The method of claim 30 wherein the first fluid contact angle for the continuous phase is greater than the second fluid contact angle for the discontinuous phase.
33. The method of claim 29 wherein the emulsion facilitating particles comprise any organically modified material, a metal sulfate, a polymer or combination of polymers.
34. The method of claim 33 wherein the organically modified material comprises silicas, fumed silicas, aluminum, titanium, zirconium, or various clay types.
35. The method of claim 29 wherein at least a portion of the emulsion facilitating particles are smaller than about 75 microns.
36. The method of claim 29 wherein the oleaginous fluid comprises diesel oil, crude oil, paraffin oil, an olefin, an ester, an amide, an amine, a synthetic oil, an ether, an acetal, a dialkyl carbonate, a hydrocarbon, or combinations thereof.
37. The method of claim 29 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises fresh water, sea water, salt water, or brine.
38. The method of claim 37 wherein the brine comprises a H₂O soluble salt.

39. The method of claim 29 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises a heavy brine.

40. The method of claim 29 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises glycerin, a polyglycol amine, a glycol, a polyol, a derivative thereof, or a combination thereof.

41. The method of claim 29 wherein the treatment fluid further comprises a viscosifier, a thinner, a lubricant, an anti-oxidant, a weighting agent, an H₂O soluble salt, a wetting agent, a fluid loss agent, a corrosion inhibitor, a surfactant, or a scale inhibitor.

42. A method of emulsifying crude oil comprising:
providing a crude oil, a fluid that is at least partially immiscible with the crude oil, and emulsion facilitating particles; and
mixing the crude oil, the fluid that is at least partially immiscible with the crude oil, and the emulsion facilitating particles so as to form a surfactant-free crude oil emulsion.
43. The method of claim 42 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises fresh water, sea water, salt water, brine, glycerin, polyglycol amines, glycols, polyols, derivatives thereof, or combinations thereof.
44. The method of claim 43 wherein the brine comprises a H₂O soluble salt.
45. The method of claim 42 wherein the emulsion facilitating particles have a first fluid contact angle for the continuous phase and a second fluid contact angle for the discontinuous phase, wherein the first fluid contact angle is about equal to the second fluid contact angle.
46. The method of claim 42 wherein the surfactant-free crude oil emulsion further comprises a weighting agent, H₂O soluble salt, a wetting agent, a fluid loss agent, a corrosion inhibitor, or a scale inhibitor.

47. A surfactant-free crude oil emulsion produced according to the method of claim 42.

48. A method of making a drilling fluid that comprises a surfactant-free emulsion comprising:

mixing an oleaginous fluid, a fluid that is at least partially immiscible with the oleaginous fluid, and emulsion facilitating particles so as to form a surfactant-free emulsion.

49. The method of claim 48 wherein the emulsion facilitating particles have a first fluid contact angle for the continuous phase and a second fluid contact angle for the discontinuous phase.

50. The method of claim 49 wherein the first fluid contact angle for the continuous phase is about equal to the second fluid contact angle for the discontinuous phase.

51. The method of claim 49 wherein the first fluid contact angle for the continuous phase is greater than the second fluid contact angle for the discontinuous phase.

52. The method of claim 48 wherein the emulsion facilitating particles comprise any organically modified material, a metal sulfate, a polymer or combination of polymers.

53. The method of claim 52 wherein the organically modified material comprises silicas, fumed silicas, aluminum, titanium, zirconium, or various clay types.

54. The method of claim 48 wherein at least a portion of the emulsion facilitating particles are smaller than about 75 microns.

55. The method of claim 48 wherein the oleaginous fluid comprises diesel oil, crude oil, paraffin oil, an olefin, an ester, an amide, an amine, a synthetic oil, an ether, an acetal, a dialkyl carbonate, a hydrocarbon, or combinations thereof.

56. The method of claim 48 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises fresh water, sea water, salt water, or brine.

57. The method of claim 56 wherein the brine comprises a H₂O soluble salt.

58. The method of claim 48 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises a heavy brine.

59. The method of claim 48 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises glycerin, a polyglycol amine, a glycol, a polyol, a derivative thereof, or a combination thereof.

60. A method of claim 48 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises fresh water, sea water, salt water, brine, glycerin, polyglycol amines, glycols, polyols, derivatives thereof, or combinations thereof.

61. The method of claim 48 further comprising adding a viscosifier, a thinner, a lubricant, an anti-oxidant, a weighting agent, an H₂O soluble salt, a wetting agent, a fluid loss agent, a corrosion inhibitor, a surfactant, or a scale inhibitor to the emulsion.

62. A drilling fluid produced according to the method of claim 48.

63. A method of fracturing a subterranean formation comprising:
providing a surfactant-free emulsion composition comprising an oleaginous fluid, a fluid that is at least partially immiscible with the oleaginous fluid, emulsion facilitating particles, and a portion of proppant particulates; and

placing the surfactant-free emulsion composition into the subterranean formation at a pressure sufficient to create or enhance at least one fracture therein.

64. The method of claim 63 wherein the surfactant-free emulsion composition further comprises a breaker.

65. The method of claim 63 further comprising removing the surfactant-free emulsion composition from the subterranean formation while leaving at least a portion of the proppant particulates in the fracture.

66. A method of installing a gravel pack comprising:

providing a gravel pack surfactant-free emulsion composition comprising a an oleaginous fluid, a fluid that is at least partially immiscible with the oleaginous fluid, emulsion facilitating particles, and a portion of gravel particulates; and

introducing the composition to a well bore penetrating a subterranean formation so that the gravel particulates form a gravel pack substantially adjacent to a desired location in the well bore.

67. A drilling fluid composition that comprises a surfactant-free emulsion comprising:

an oleaginous fluid;

a fluid that is at least partially immiscible with the oleaginous fluid; and

emulsion facilitating particles.

68. The composition of claim 67 wherein the surfactant-free emulsion comprises a continuous phase and a discontinuous phase.

69. The composition of claim 68 wherein the continuous phase comprises the oleaginous fluid.

70. The composition of claim 68 wherein the continuous phase comprises the fluid that is at least partially immiscible with the oleaginous fluid.

71. The composition of claim 67 wherein the emulsion facilitating particles have a fluid contact angle in the range from about 70° to about 140°.

72. The composition of claim 67 wherein the emulsion facilitating particles have a first fluid contact angle for the continuous phase and a second fluid contact angle for the discontinuous phase.

73. The composition of claim 72 wherein the first fluid contact angle for the continuous phase is about equal to the second fluid contact angle for the discontinuous phase.

74. The composition of claim 72 wherein the first fluid contact angle for the continuous phase is greater than the second fluid contact angle for the discontinuous phase.

75. The composition of claim 67 wherein at least a portion of the emulsion facilitating particles are smaller than about 75 microns.

76. The composition of claim 67 wherein the emulsion facilitating particles comprise any organically modified material, metal sulfate, polymer or combinations of polymers.

77. The composition of claim 76 wherein the organically modified material comprises modified silicas, fumed silicas, aluminum, titanium, zirconium, or various clay types.

78. The composition of claim 76 wherein the metal sulfate comprises iron sulfate, copper sulfate, or combinations thereof.

79. The composition of claim 67 wherein the oleaginous fluid comprises diesel oil, crude oil, paraffin oil, an olefin, an ester, an amide, an amine, a synthetic oil, an ether, an acetal, a dialkyl carbonate, a hydrocarbon, or combinations thereof.

80. The composition of claim 67 wherein the fluid that is at least partially immiscible with the oleaginous fluid comprises fresh water, sea water, salt water, brine, glycerin, polyglycol amines, glycols, polyols, derivatives thereof, or combinations thereof.

81. The composition of claim 80 wherein the brine comprises a H₂O soluble salt.

82. The composition of claim 81 wherein the H₂O soluble salt comprises zinc bromide, calcium bromide, calcium chloride, sodium chloride, sodium bromide, sodium formate, potassium formate, sodium acetate, potassium acetate, calcium acetate, ammonium acetate, ammonium chloride, ammonium bromide, sodium nitrate, potassium nitrate, ammonium nitrate, calcium nitrate, sodium carbonate, potassium carbonate, or combinations thereof.

83. The composition of claim 67 further comprising a viscosifier, a thinner, a lubricant, an anti-oxidant, a weighting agent, an H₂O soluble salt, a wetting agent, a fluid loss agent, a corrosion inhibitor, a surfactant, or a scale inhibitor.

84. The composition of claim 83 wherein the H₂O soluble salt comprises any salt which reduces the water phase activity of the surfactant-free emulsion.

85. A treatment fluid comprising a surfactant-free emulsion, wherein the surfactant-free emulsion comprises:

an oleaginous fluid;

a fluid that is at least partially immiscible with the oleaginous fluid; and

emulsion facilitating particles.

86. The treatment fluid of claim 85 wherein the surfactant-free emulsion is electrically stable from a range of about 20 volts to about 2000 volts.

87. The treatment fluid of claim 85 further comprising a viscosifier, breaker, weighting agent, H₂O soluble salt, a surfactant or wetting agent.

88. The treatment fluid of claim 85 wherein the treatment fluid is used as a drilling fluid, a fracturing fluid, or a gravel packing transport fluid.